

**ARTIFICIAL NEURAL NETWORK (ANN) – META EP  
TECHNIQUE FOR LIGHTNING PREDICTION**

**This thesis is presented in partial fulfillment for the award of the  
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## **APPROVAL**

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## ABSTRACT

Malaysia has high lightning and thunderstorm occurrences throughout the year because it is situated near the equator line which is characterized by high lightning and thunderstorm activity. With the existing and availability of many sophisticated instrument, weather data can be recorded easily. By using these data, some efforts are being made in order to improve the prediction of weather conditions with great potentiality. This project presents the development of Meta-Evolutionary Programming (EP) and Artificial Neural Network (ANN) prediction system for lightning occurrence based on historical lightning and meteorological data. It involved the development of the ANN design and EP optimization technique to optimize learning rate and momentum constant in order to improve the performance of the prediction system. ANN, which was inspired by the way biological nervous systems process information, is utilized in this study due to its ability to learn by example and do tasks based on training experience. However, there is no efficient way to design the optimal architecture for a given task automatically because the process of finding suitable network architectures could be troublesome and time-consuming. Therefore, a capable optimization technique such as EP is engaged in the study to find the best ANN architectures systematically so that the lightning prediction can be accurately performed with less computation time.

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